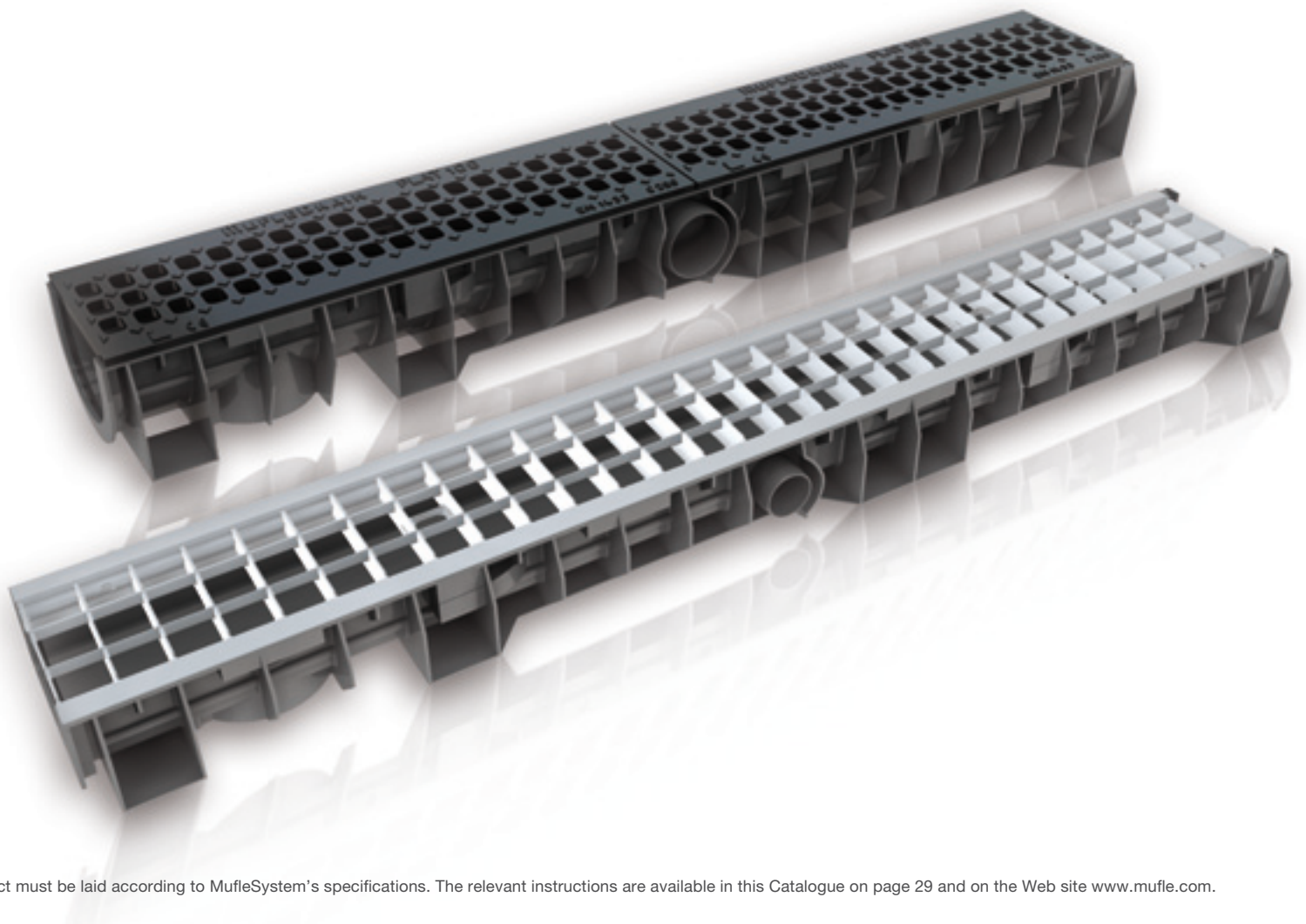


FLat

The system:

- it supports 3 load classes (A15, B125, C250) in compliance with Standard EN 1433
- it is made up of a channel - entirely made from HD-PE - which needs no strengthening frame
- it has a wide usable section for drainage and uses lightweight gratings with optimised sizes
- it has a small size thanks to its flat bottom to which a convenient drain gate can be screwed, if needed
- it comprises 4 different types of gratings (with rungs, slots, square mesh, anti-heel mesh) made from galvanised steel, stainless steel and ductile iron
- it is supplemented with different fixing systems, which are ideal for all requirements and range from the classic tie-rod to a simple locking system using a protrusion inside the channel
- it is ideal whenever there is little installation space such as in underground car parks or parking decks, flat roofs, terraces
- it is ideal whenever high-quality aesthetic finishes are to be achieved, since the gratings rest directly on the channel's contact surface, thus covering it completely
- it comes complete with drain boxes with siphon
- the range is made up of 2 channels with 1 width and 2 heights (100/55 and 100/80)



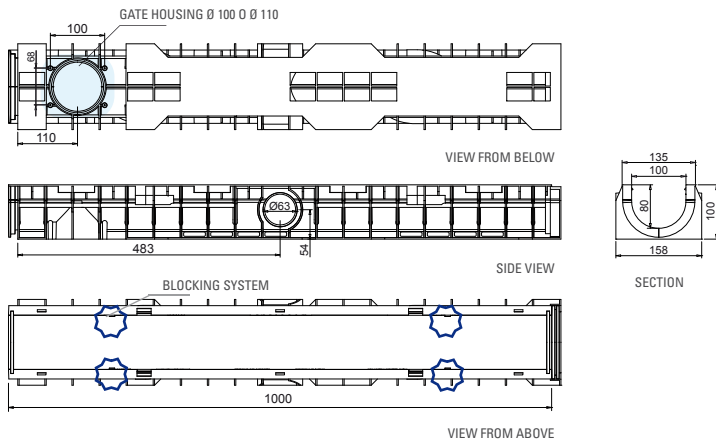


100

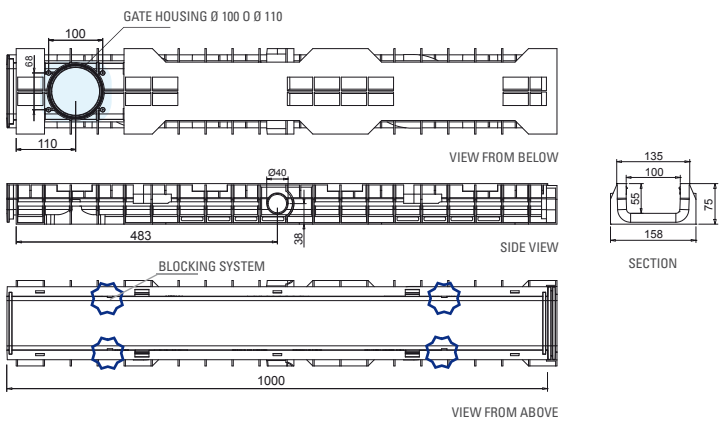


CHANNELS

**FLAT
100**



FLAT 100/80								
CODE	PRICE	MATERIAL	EXTERNAL DIMENSIONS L x l x h	INTERNAL DIMENSIONS L x l x h	WEIGHT	DRAINAGE SECTION	CAPACITY	PREINSTALLED DRAIN
	€		mm	mm	kg	cm ²	dm ³	mm
706000		PE-HD	1000 x 158 x 100	1000 x 100 x 80	1,60	69,28	6,92	side 2 x Ø 63 bottom ¹ 1 x Ø 100; 1 x Ø 110



FLAT 100/55								
CODE	PRICE	MATERIAL	EXTERNAL DIMENSIONS L x l x h	INTERNAL DIMENSIONS L x l x h	WEIGHT	DRAINAGE SECTION	CAPACITY	PREINSTALLED DRAIN
	€		mm	mm	kg	cm ²	dm ³	mm
706001		PE-HD	1000 x 158 x 75	1000 x 100 x 55	1,40	54,44	5,44	side 2 x Ø 40 bottom ¹ 1 x Ø 100; 1 x Ø 110

1- For drainage purposes use the drain gate with outlet kit (available in two versions Ø100 and Ø110).
 N.B. Waterproofing: in order to ensure the channels are waterproof, a bituminous adhesive sealant should be used. Heat-sealing the channel joints makes sure there will be no leakages through said joints for a very long time. For further information please contact MufleSystem's Technical Department.
 N.B. Sizes and weights are subject to usual manufacturing tolerance values.



GRATINGS



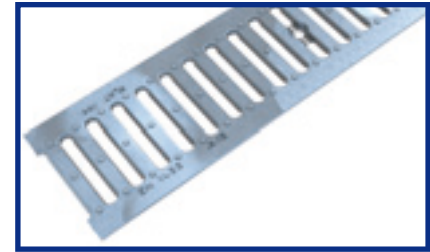
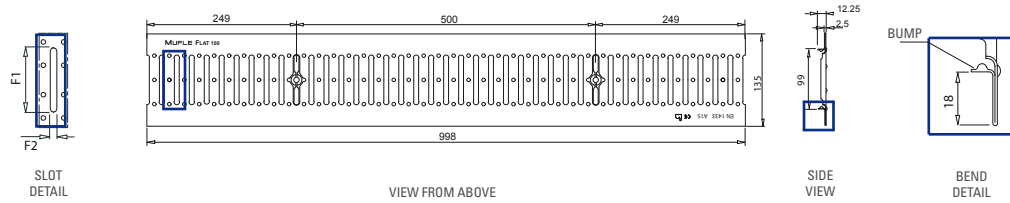
**FLAT
100**

APPLICATIONS OF GALVANISED STEEL

Green areas and parks
Pedestrian areas and/or cycle lanes
Sports facilities
Terraces

APPLICATIONS OF STAINLESS STEEL

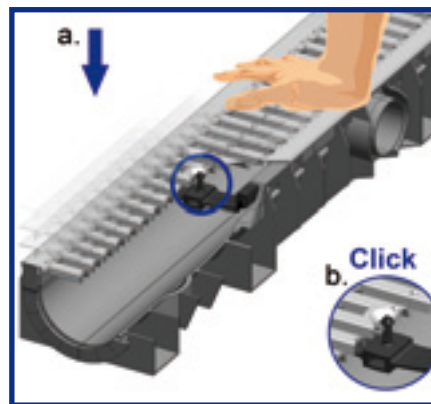
Green areas and parks
Pedestrian areas and/or cycle lanes
Sports facilities
Terraces
Kitchens in hospitals, restaurants and similar facilities



SLOTTED GRATING									
CODE	PRICE €	MATERIAL	DIMENSIONS L x l x h mm	WEIGHT kg	DRAINAGE SURFACE dm ²	OPENINGS F1 X F2 mm	FIXING SYSTEM		
							tie-tod	clip	protrusion (no fixing) ⁴
506110		galvanised steel DX51D ³	998 x 135 x 2,5	1,30	2,35	83,0 x 8,5			
506111		pickled stainless steel AISI 304 ²							
506112		galvanised steel DX51D ³	498 x 135 x 2,5	0,65	1,175				
506113		pickled stainless steel AISI 304 ²							

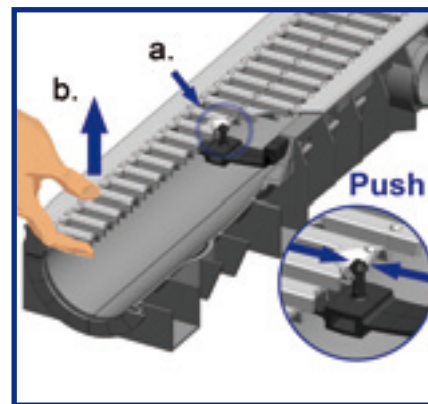
GRATING ASSEMBLY BY MEANS OF CLIPS

- Place the grating on the channel. Match the head of the FLAT clips with the special holes on the grating;
- Press by hand on the grating until it gets completely hooked.



DISASSEMBLY OF THE GRATING

- Press slightly on the head of the FLAT clips until the grating gets unhooked;
- Lift it out.



The FLAT clip makes it possible to fix the FLAT rung gratings quickly and safely with neither nuts nor bolts!!!

2- Classification according to American Standard ASTM.

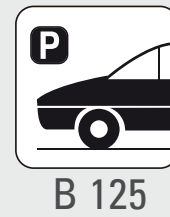
3- Classification according to Standard EN 10142 (2002) and symbolic designation according to EN 10027-1 (-2) (2006).

4- SHooking system using a protrusion inside the channel. The blocking system does not fix the grating to the channel. Either the tie-rod or the clip system should be used for steadyfixing.

N.B. Sizes and weights are subject to usual manufacturing tolerance values.



GRATINGS



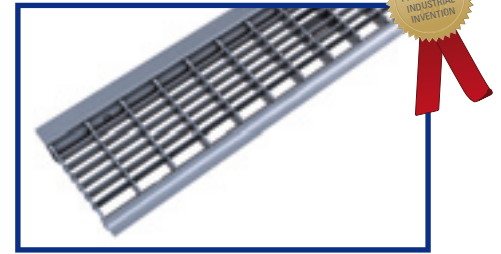
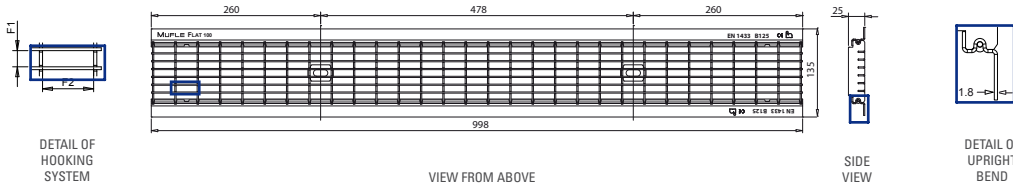
**flat
100**

APPLICATIONS OF GALVANISED STEEL

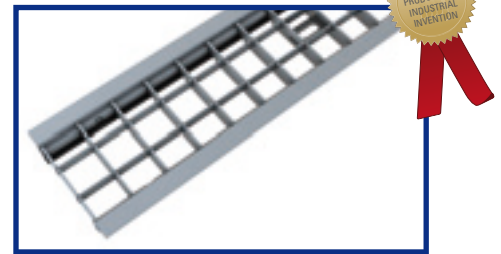
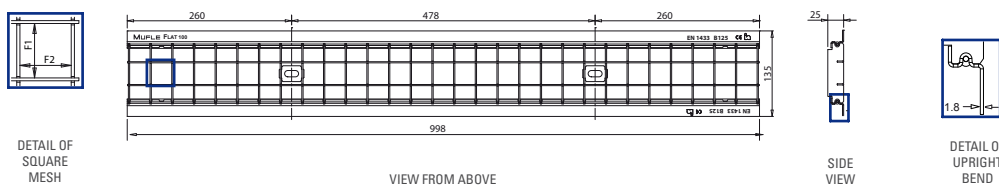
Pavements
Lay-bys and private car parks

APPLICATIONS OF STAINLESS STEEL

Pavements
Lay-bys and private car parks
Food factories
Chemically aggressive environments



ANTI-HEEL MESH GRATING								25 mm	
CODE	PRICE €	MATERIAL	DIMENSIONS L x l x h mm	WEIGHT kg	DRAINAGE SURFACE dm ²	OPENINGS F1 X F2 mm	FIXING SYSTEM		
							tie-tod	protrusion (no fixing) ⁴	
506102		hot dip galvanised steel DD11 (1.0332) ⁵	998 x 135 x 1,8	3,30	7,05	10,2 x 32,2			
506106		pickled stainless steel AISI 304 ²							
506104		hot dip galvanised steel DD11 (1.0332) ⁵	498 x 135 x 1,8	1,65	3,525				
506108		pickled stainless steel AISI 304 ²							



SQUARE MESH GRATING								25 mm	
CODE	PRICE €	MATERIAL	DIMENSIONS L x l x h mm	WEIGHT kg	DRAINAGE SURFACE dm ²	OPENINGS F1 X F2 mm	FIXING SYSTEM		
							tie-tod	protrusion (no fixing) ⁴	
506103		hot dip galvanised steel DD11 (1.0332) ⁵	998 x 135 x 1,8	2,80	7,10	34,2 x 32,2			
506107		pickled stainless steel AISI 304 ²							
506105		hot dip galvanised steel DD11 (1.0332) ⁵	498 x 135 x 1,8	1,40	3,55				
506109		pickles stainless steel AISI 304 ²							

2- Classification according to American Standard ASTM.

4- Hooking system using a protrusion inside the channel. The blocking system does not fix the grating to the channel. Either the tie-rod or the clip system should be used for steady fixing.

5- Classification according to Standard EN 10111 (2008) and symbolic designation according to EN 10027-1 (-2) (2006).

N.B. Sizes and weights are subject to usual manufacturing tolerance values.



GRATINGS

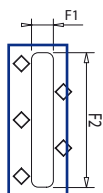


C 250

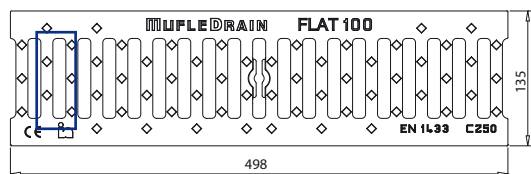
**FLAT
100**

APPLICATIONS OF DUCTILE IRON

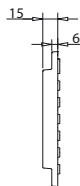
- Kerbs
- Historical town centres (slow traffic)
- Parking areas
- Parking decks



SLOT
DETAIL



VIEW FROM ABOVE




SIDE
VIEW



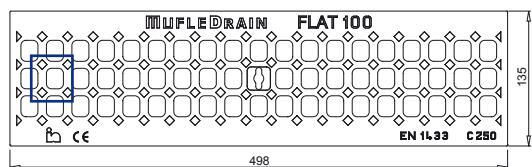
SLOTTED GRATING 13 mm



CODE	PRICE €	MATERIAL	DIMENSIONS L x l x h mm	WEIGHT kg	DRAINAGE SURFACE cm ²	OPENINGS F1 X F2 mm	FIXING SYSTEM	
							tie-tod	no fixing
506100		GJS 500/7 ⁶ ductile iron water based paint coated	498 x 135 x 6	3,50	1,90	13,0 x 80,0		up to Class C250 as per Standard EN 1433



SLOT
DETAIL



VIEW FROM ABOVE




SIDE
VIEW



MESH GRATING



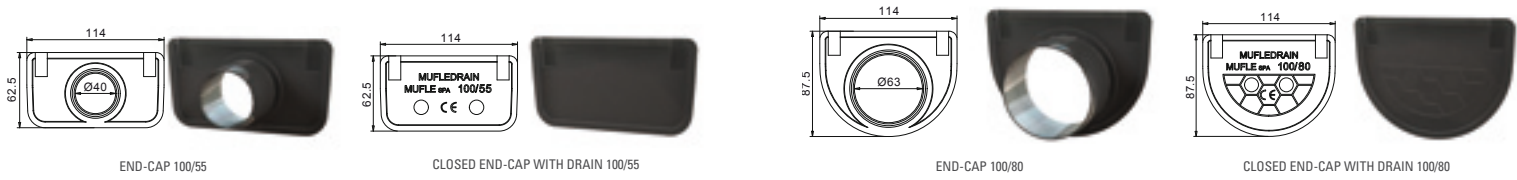
CODE	PRICE €	MATERIAL	DIMENSIONS L x l x h mm	WEIGHT kg	DRAINAGE SURFACE cm ²	OPENINGS F1 X F2 mm	FIXING SYSTEM	
							tie-tod	no fixing
506101		GJS 500/7 ⁶ ductile iron water based paint coated	498 x 135 x 7	3,30	2,15	21,0 x 17,0		up to Class C250 as per Standard EN 1433

6- Classification according to Standard EN 1563 (2009).
N.B. Sizes and weights are subject to usual manufacturing tolerance values.



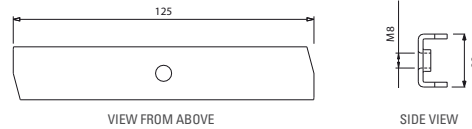
ACCESSORIES

**FLAT
100**



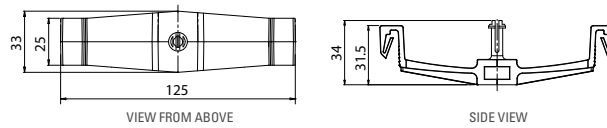
END CAPS

CODE	PRICE €	TYPE	MATERIAL	VALID FOR CHANNELS	PREINSTALLED DRAIN
700500		end-cap with drain	PE-HD	100/55	1 x Ø 40
700508		closed end-cap	PE-HD	100/55	-
700501		end-cap with drain	PE-HD	100/80	1 x Ø 63
700509		closed end-cap	PE-HD	100/80	-



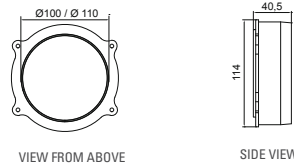
KIT TIE-ROD + SCREWS

CODE	PRICE €	MATERIAL	VALID FOR GRATINGS	SCREW	KIT FOR 1 ml
500412		galvanised steel	FLAT galvanised steel	M8 x 40 TBL combi	2 tie-rods + 2 screws
500413		stainless steel	FLAT stainless steel	M8 x 40 TBL combi stainless steel	2 tie-rods + 2 screws
500414		black galvanised steel	FLAT ductile iron	M8 x 40 black with hexagonal head	2 tie-rods + 2 screws



KIT CLIP

CODE	PRICE €	MATERIAL	VALID FOR GRATINGS	KIT FOR 1 ml
511212		PE-HD	FLAT slotted galvanised steel - stainless steel	2 clip



KIT OUTLET + SCREWS

CODE	PRICE €	MATERIAL	VALID FOR CHANNELS	DIAMETER mm	KIT FOR 1 ml
506114		PE-HD	100/55 - 100/80	Ø 100	1 outlet Ø 100 + 4 screws
506115		PE-HD	100/55 - 100/80	Ø 110	1 outlet Ø 110 + 4 screws

N.B. Sizes and weights are subject to usual manufacturing tolerance values.

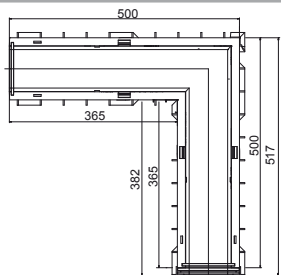


SPECIAL PIECES

**FLAT
100**

LEFT CORNER

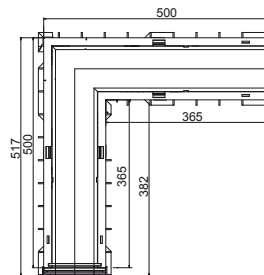
FLAT 100



CODE	PRICE €	MODEL
706100		100/80
706101		100/55

RIGHT CORNER

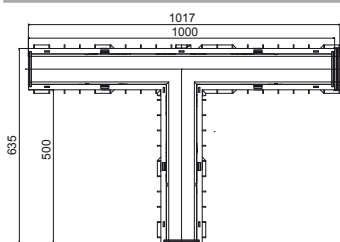
FLAT 100



CODE	PRICE €	MODEL
706102		100/80
706103		100/55

LEFT TI

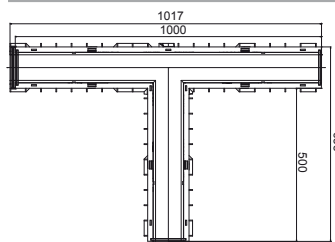
FLAT 100



CODE	PRICE €	MODEL
706104		100/80
706105		100/55

RIGHT TI

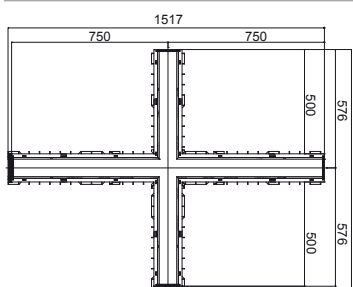
FLAT 100



CODE	PRICE €	MODEL
706106		100/80
706107		100/55

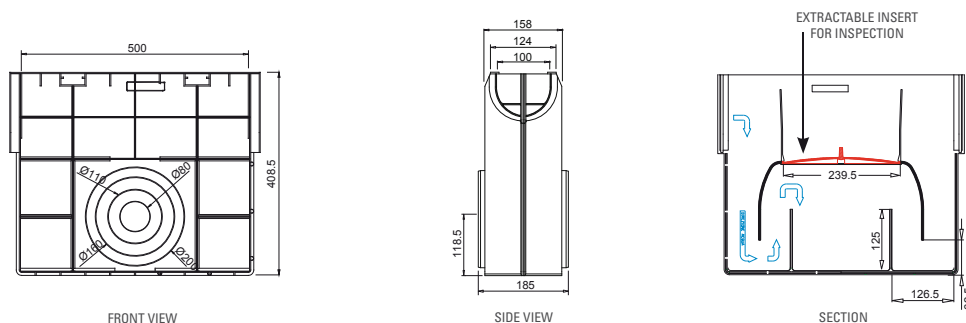
CROSS

FLAT 100



CODE	PRICE €	MODEL
706108		100/80
706109		100/55

DRAIN BOX WITH SYPHON



FLAT 100

CODE	PRICE €	MATERIAL	EXTERNAL DIMENSIONS L x l x h mm	INTERNAL DIMENSIONS L x l x h mm	MAXIMUM LARGE mm	HEIGHT OF OUTLETS mm	WEIGHT kg	PREINSTALLED DRAIN mm
706002		PE-HD	500 x 124 x 408,5	500 x 100 x 400	158	118,5	2,50	2 x Ø 80; 2 x 110 2 x Ø 160; 2 x Ø 200

N.B. Sizes and weights are subject to usual manufacturing tolerance values.



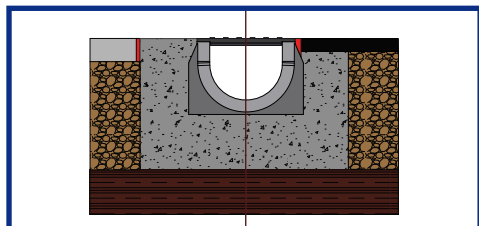
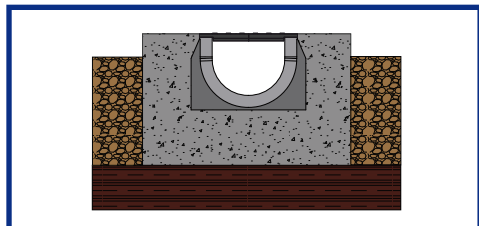
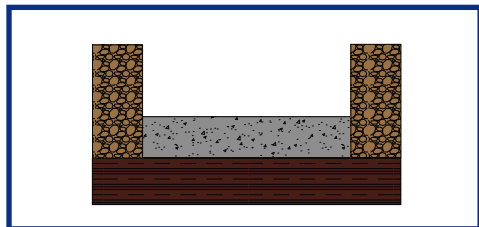
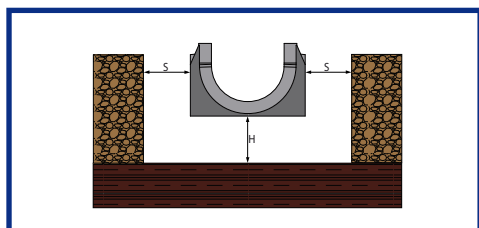
“For all the drainage channels the manufacturer shall supply written instructions for general installation” (Ref. § 7.17 EN 1433)

The installation instructions enclosed in the present technical section are given only as an example in order to supply the main guide lines to the final fitter.

Any particular installation must be evaluated/agreed between MufleSystem srl and the project maker.

The correct installation is necessary to guarantee the proper loads resistance of the drainage system (channel and grating) to static and dynamical traffic which is subjected to.

The correct installation involves a longer operational length of the drainage system itself as well as its better hydraulic function.



NEW FEATURE:
The channels can be installed with preassembled gratings through male-female coupling.

Step 1

HOLE SIZE

The hole needed to lay the MufleDrain channel must allow not only for the size of the channel and the drain piping but also for adequate space for the base H and the side concrete props S. The dimensions to be followed are shown in the Summary Table. In this step make sure the underlying layer is suitable to the load it is expected to support.

Step 2

CONCRETE BASE

Cast the concrete base H up to the height specified, allowing for any inclination in the drainage line. In case that cycles of loading and unloading are often (for example: periodic transit of vehicles) or the loads are particular heavy (E600 - F900), we recommended to reinforce the concrete base with an electro-welded net or with or beaded mouldings Ø 8 with mesh 15x15 cm. At this stage it is needed to arrange possible slopes of the drainage line.

Step 3

CHANNEL ARRANGEMENT

Lay the channels starting from the flow outlet and block them at basis in order to avoid any floating or misalignment during the concrete casting for the side prop.

Allow for the drains required and build the side prop S up to the maximum height allowed by the final coating. Shape it according to the needs based on the drawing. Introduce and fix the grating required beforehand in order to prevent any deformation of the channel due to the thrust of concrete and to speed up installation.

As well as the step 2, also for the side prop concrete arrange the reinforcement.

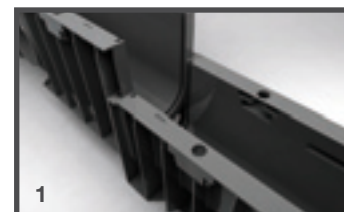
Step 4

FINAL COATING

When applying the final coating, make sure its upper profile reaches up to minimum 3/5 mm above the grating's flow plane.

Recommendations for installation

1. In case that channels watertightness is requested, MufleSystem is purposely recommending the use of a bituminous silicone sealant “SHELL TIXOPHALTE”: after carrying out the side prop, apply a thin and homogeneous sealant strip on each slot between the channels and the following one (clean the eventual exceeding sealant). It is strongly advised not to apply the strips of “SHELL TIXOPHALTE” inside the slots in the female joint of the channels before coupling them. Eventually a through and long- lasting guarantees to avoid any leakages can be obtained by welding the joints; this requires welding machines and experienced technicians.
2. While carrying out the phase 2 and 3, protect the gratings with a PVC film so that no final cleaning must be carried out to remove any concrete residues.
3. In case the drainage line is subjected to horizontal loads (for example concrete casting for industrial paving, private car parks and parking decks), it is necessary to arrange effective expansion joints for both direction, parallel and perpendicular to the channels. These joints shall be placed according to the norm standards in force and shall not be placed close to drainage line.
4. In case the drainage line shall be installed on roofs or terraces, it is obligatory to arrange a waterproof sheet according to specific projects.



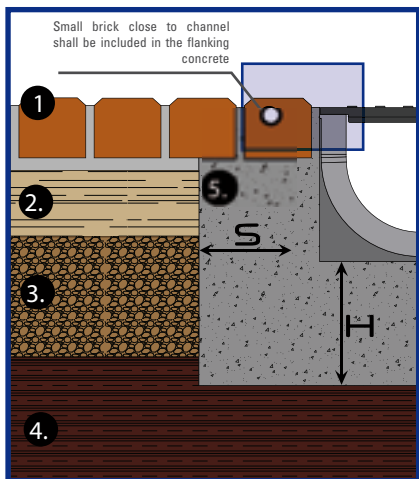
N.B. MufleSystem srl reserves the right to change the technical characteristics herein specified without prior notice. Said technical characteristics are given for information purposes only and are subject to changes as our products are developed.



INSTALLATION

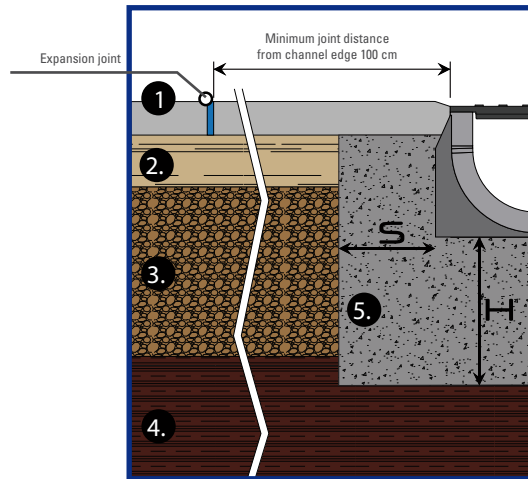
flat

Case 1 Flooring (A15-B125-C250)



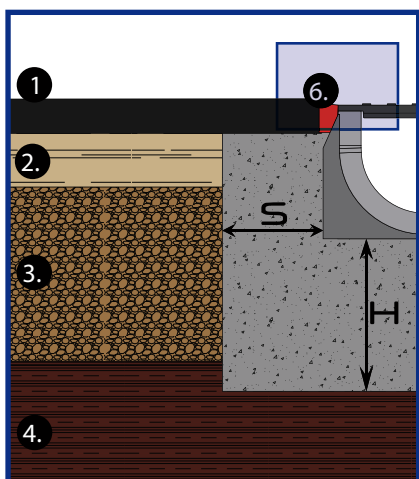
1. Flooring
2. Lower bed layer
3. Bearing layer
4. Subfloor
5. Concrete reinforcement layer

Case 2 Concrete flooring (A15-B125-C250)

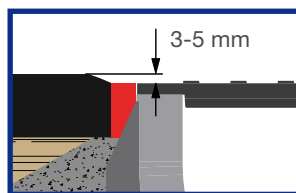


1. Flooring
2. Lower bed layer
3. Bearing layer
4. Subfloor
5. Concrete reinforcement layer
6. Expansion joint

Case 3 Asphalt (A15-B125-C250)



1. Flooring
2. Lower bed layer
3. Bearing layer
4. Subfloor
5. Concrete reinforcement layer
6. Safety joint (if required)



This Sheet is only aimed to give advice on the installation of channels mod. MufleDrain. In any case, always:

- check the carrying capacity characteristics of the underlying layer
- we recommend using Class S4 concrete (EN 206-1) and stone aggregate with maximum diameter 8 mm.
- comply with the height of the installation surface and the thickness of the prop as specified according to the load classes.

SUMMARY TABLE

Load class (EN 1433)		A 15	B 125	C 250
Applicable load (EN 1433)	kN	15	125	250
Minimum height H of concrete laying bed	mm	100	100	150
Minimum thickness S of the concrete flanking	mm	100	100	150
Concrete compression strength class (EN 206-1)		C 20/25	C 25/30	C 25/30
Concrete compression strength class' (EN 206-1)		C 30/37 XF4	C 30/37 XF4	C 30/37 XF4

7- If concrete can be affected by frost and thaw cycles.

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N.B. Sizes and weights are subject to usual manufacturing tolerance values.



SPECIFICATIONS

FLAT

1. Supply and installation of MufleDrain FLAT type HD-PE drainage channel with external stiffening ribs and male-female coupling system allowing the assembly between one channel and the next with the relevant pre-assembled gratings. The channel will have 2 side drain diaphragms at pre-determined points and it will be designed to house a HD-PE drain gate (diameter 100 mm - 110 mm) on the bottom through 4 screws. The channel surface will be perfectly smooth and have a low roughness coefficient to allow the best water flow. It will also be perfectly water-tight and devoid of any connection points with the outside. The channel will have 2 protrusions on each side of the internal walls in order to ensure the gratings can be locked in place. The channel will have the following dimensions: length 1.000 mm, internal net gap 100 mm, internal height ___ mm.
2. Supply and installation of ductile iron GJS 500/7 covering gratings according to EN 1563-2004 for MufleDrain FLAT drainage channels with bar fixing system, load class C250 according to EN 1433-2004, slot width 13 mm, length 498 mm, width 135 mm.
3. Supply and installation of ductile iron GJS 500/7 covering gratings according to EN 1563-2004 with mesh for MufleDrain FLAT drainage channel with bar fixing system, load class C250 according to EN 1433-2004, length 498 mm, width 135 mm.
4. Supply and installation of galvanised (stainless) steel square-mesh or anti-heel covering gratings for MufleDrain FLAT drainage channels with bar fixing system, load class B125 according to EN 1433-2004, length 998 mm, width 135 mm. A similar grating will be available upon request with length 498 mm. The dimensions will be 33 x 33 mm in the square mesh and 33 x 11 mm in the anti-heel mesh.
5. Supply and installation of galvanised (stainless) steel rung covering gratings for MufleDrain FLAT drainage channels with bar fixing system (Clip), load class A15 according to EN 1433-2004, length 998 mm, width 135 mm. A similar grating will be available upon request with length 498 mm.
6. Supply and installation of HD-PE end cap for MufleDrain drainage channel with coupling system into the special channel housing.
7. Supply and installation of HD-PE open cap with drainage hole diameter ___mm for MufleDrain drainage channel with coupling system into the special channel housing.
8. Supply and installation of MufleDrain FLAT type HD-PE drain box with siphon for MufleDrain FLAT drainage channels, with external stiffening ribs and male-female coupling system. The top of the built-in siphon in the drain box shall be detachable in order to allow the cleaning. The drain box will have 2 preformed outlets with diameter until 200 mm. The sizes of the drain box shall be length 500 mm, internal net gap _____ mm, internal height 400 mm.